

**WE CLAIM:**

1           1.       A method for improving the performance of a golf club, comprising the steps of:  
2                   fabricating a golf club head having a face;  
3                   friction stir processing a predetermined area of the surface of the golf club face;  
4           and  
5                   re-surfacing at least the predetermined area subjected to friction stir processing so  
6           as to provide a desired surface topology.

1           2.       The method of Claim 1, wherein the golf club head comprises a metal selected  
2           from the group consisting of aluminum, titanium, nickel, copper, iron, and alloys thereof.

1           3.       The method of Claim 1, wherein said step of fabricating includes a step of casting  
2           or forging.

1           4.       The method of Claim 1, wherein said step of friction stir processing is performed  
2           using a FSP tool rotating at a rate between 150 and 2000 rotations per minute.

1           5.       The method of Claim 1, wherein said step of friction stir processing is performed  
2           using a FSP tool moved along the workpiece surface at a rate of 50 to 7000 mm/minute.

1           6.       The method of Claim 1, wherein said step of re-surfacing includes a step of  
2           milling.

1           7.       The method of Claim 1, wherein the desired surface topology includes at least one  
2           groove.

1           8.       A method for improving the performance of a golf club, comprising the steps of:  
2                   friction stir processing a predetermined area of the surface of a metallic  
3           workpiece; and  
4                   fabricating a golf club head having a face which includes the predetermined area.

1        9.     The method of Claim 8, wherein the metallic workpiece comprises a metal  
2        selected from the group consisting of aluminum, titanium, nickel, copper, iron, and alloys  
3        thereof.

1        10.    The method of Claim 8, wherein the metallic workpiece has a shape selected from  
2        the group consisting of strip, plate and block.

1        11.    The method of Claim 8, wherein said step of fabricating includes a step of  
2        forging.

1        12.    The method of Claim 8, wherein said step of friction stir processing is performed  
2        using a FSP tool rotating at a rate between 150 and 2000 rotations per minute.

1        13.    The method of Claim 8, wherein said step of friction stir processing is performed  
2        using a FSP tool moved along the workpiece surface at a rate of 50 to 7000 mm/minute.

1        14.    The method of Claim 8, further comprising the step of:  
2            re-surfacing at least the predetermined area subjected to friction stir processing so  
3            as to provide a desired surface topology.

1        15.    The method of Claim 14, wherein the step of re-surfacing is performed before the  
2        step of fabricating.

1        16.    The method of Claim 14, wherein the step of re-surfacing is performed after the  
2        step of fabricating.

1        17.    The method of Claim 14, wherein the desired surface topology includes at least  
2        one groove.

1        18.    A golf club with improved performance, comprising a head with a face, said face  
2        comprising friction stir processed metal.

1           19.    The golf club of Claim 18, wherein said friction stir processed metal is selected  
2    from the group consisting of aluminum, titanium, nickel, copper, iron, and alloys thereof.

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